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国際事務局



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2002 年 8 月 22 日 (22.08.2002)

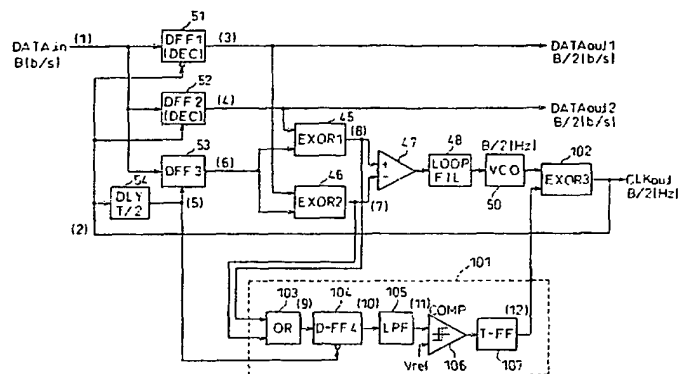
PCT

(10) 国際公開番号  
WO 02/065688 A1

- (51) 国際特許分類<sup>7</sup>: H04L 7/033 (KUWATA, Naoki) [JP/JP]. 山本拓司 (YAMAMOTO, Takuji) [JP/JP]; 〒211-8588 神奈川県川崎市中原区上小田中4丁目1番1号 富士通株式会社内 Kanagawa (JP).
- (21) 国際出願番号: PCT/JP01/01139
- (22) 国際出願日: 2001 年 2 月 16 日 (16.02.2001) (74) 代理人: 石田 敬, 外 (ISHIDA, Takashi et al.); 〒105-8423 東京都港区虎ノ門三丁目5番1号 虎ノ門37 森ビル 青和特許法律事務所 Tokyo (JP).
- (25) 国際出願の言語: 日本語
- (26) 国際公開の言語: 日本語 (81) 指定国 (国内): CA, CN, GB, JP, US.
- (71) 出願人 (米国を除く全ての指定国について): 富士通株式会社 (FUJITSU LIMITED) [JP/JP]; 〒211-8588 神奈川県川崎市中原区上小田中4丁目1番1号 Kanagawa (JP).
- (72) 発明者; および
- (75) 発明者/出願人 (米国についてのみ): 桑田直樹
- 添付公開書類:  
— 国際調査報告書
- 2文字コード及び他の略語については、定期発行される各PCTガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

(54) Title: TIMING EXTRACTING CIRCUIT OF OPTICAL RECEIVER USING FREQUENCY CLOCK THAT IS HALF THE DATA TRANSMISSION RATE, AND DUTY SHIFT ADAPTIVE CIRCUIT OF OPTICAL TRANSCEIVER

(54) 発明の名称: データ伝送速度の1/2周波数クロックを用いる光受信機のタイミング抽出回路及び光送受信機のデューティずれ対応回路



(57) Abstract: An improved timing extracting circuit of optical receiver, particularly using a frequency clock that is half the data transmission rate, and a duty shift adaptive circuit of optical transceiver. The timing extracting circuit has a detector circuit that, using a PLL circuit including a phase comparator circuit for performing a phase comparison between a data signal of a bit rate B (bit/s) and a clock signal of B/2 (Hz) at an interval of 2/B (sec), detects, in response to reception of a data signal of a predetermined pattern, that the phase comparator circuit no longer outputs any phase comparison information; and further has a control circuit responsive to that detection to control the phase of the clock signal so as to maintain the synchronization. The duty shift adaptive circuit controls, based on the result of determination of the duty between the input data before the synchronization of the PLL circuit is established and the input data after the establishment, the data identification phase before and after the establishment.

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# PATENT COOPERATION TREATY

**PCT**

NOTICE INFORMING THE APPLICANT OF THE  
COMMUNICATION OF THE INTERNATIONAL  
APPLICATION TO THE DESIGNATED OFFICES

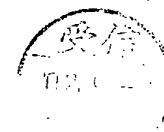
(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

ISHIDA, Takashi  
A. AOKI, ISHIDA & ASSOCIATES  
Toranomom 37 Mori Bldg., 5-1,  
Toranomom 3-chome  
Minato-ku, Tokyo 105-8423  
JAPON

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|   |   |                                |  |
|---|---|--------------------------------|--|
| Date of mailing (day/month/year)<br>22 August 2002 (22.08.02) |   | <b>IMPORTANT NOTICE</b>        |  |
| Applicant's or agent's file reference<br>H756-PCT             |   |                                |  |
| International application No.<br>PCT/JP01/01139               | International filing date (day/month/year)<br>16 February 2001 (16.02.01) | Priority date (day/month/year) |  |
| Applicant<br>FUJITSU LIMITED et al                            |   |                                |  |

1. Notice is hereby given that the International Bureau has **communicated**, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this notice:  
**US**

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:  
**CA,CN,GB,JP**

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this notice is a copy of the international application as published by the International Bureau on  
22 August 2002 (22.08.02) under No. WO 02/065688

**4. TIME LIMITS for filing a demand for international preliminary examination and for entry into national phase**

The applicable time limit for entering the national phase will, **subject to what is said in the following paragraph** be **30 MONTHS** from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of **19 months** from the priority date, but also in respect of any designated Office, in the absence of filing of such demand, where Article 22(1) as modified with effect from 1 April 2002 applies in respect of the designated Office. For further details, see PCT Gazette No.44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the PCT Newsletter, October and November 2001 and February 2002 issues.

In practice, **time limits other than the 30-month time limit** will continue to apply, for various periods of time, in respect of certain designated or elected Offices. For **regular updates on the applicable time limits** (20,21,30 or 31 months, or other time limit), Office by Office, refer to the PCT Gazette, the PCT Newsletter and the PCT Applicant's Guide, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

For filing a **demand for international preliminary examination**, see the PCT Applicant's Guide, Volume I/A, Chapter IX. Only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II.)

It is the applicant's **sole responsibility** to monitor all these limits.

|   |   |
|---|---|
| The International Bureau of WIPO<br>34, chemin des Colombettes<br>1211 Geneva 20, Switzerland | Authorized officer<br><br><b>J. Zahra</b> |
| Facsimile No. (41-22) 740.14.35   | Telephone No. (41-22) 338.91.11           |

## PATENT COOPERATION TREATY

PCT

INFORMATION CONCERNING ELECTED  
OFFICES NOTIFIED OF THEIR ELECTION

(PCT Rule 61.3)

From the INTERNATIONAL BUREAU

To:

ISHIDA, Takashi  
A. AOKI, ISHIDA & ASSOCIATES  
Toranomon 37 Mori Bldg., 5-1,  
Toranomon 3-chome  
Minato-ku, Tokyo 105-8423  
JAPON

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|---|---|--------------------------------|--|
| Date of mailing (day/month/year)<br>22 August 2002 (22.08.02) |   | IMPORTANT INFORMATION          |  |
| Applicant's or agent's file reference<br>H756-PCT             |   |                                |  |
| International application No.<br>PCT/JP01/01139               | International filing date (day/month/year)<br>16 February 2001 (16.02.01) | Priority date (day/month/year) |  |
| Applicant<br>FUJITSU LIMITED et al                            |   |                                |  |

1. The applicant is hereby informed that the International Bureau has, according to Article 31(7), notified each of the following Offices of its election:

National : CA,CN,GB,JP,US

2. The following Offices have waived the requirement for the notification of their election; the notification will be sent to them by the International Bureau only upon their request:

None

3. The applicant is reminded that he must enter the "national phase" **before the expiration of 30 months from the priority date** before each of the Offices listed above. This must be done by paying the national fee(s) and furnishing, if prescribed, a translation of the international application (Article 39(1)(a)), as well as, where applicable, by furnishing a translation of any annexes of the international preliminary examination report (Article 36(3)(b) and Rule 74.1).

Some offices have fixed time limits expiring later than the above-mentioned time limit. For detailed information about the applicable time limits and the acts to be performed upon entry into the national phase before a particular Office, see Volume II of the PCT Applicant's Guide.

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|---|--|
| <p>The International Bureau of WIPO<br/>34, chemin des Colombettes<br/>1211 Geneva 20, Switzerland</p> <p>Facsimile No. (41-22) 740.14.35</p> | <p>Authorized officer:<br/>J. Zahra</p> <p>Telephone No. (41-22) 338.83.38</p> |
|---|--|

## PATENT COOPERATION TREATY

**PCT**  
**NOTIFICATION OF TRANSMITTAL**  
**OF COPIES OF TRANSLATION**  
**OF THE INTERNATIONAL PRELIMINARY**  
**EXAMINATION REPORT**

(PCT Rule 72.2)

From the INTERNATIONAL BUREAU

To:

ISHIDA, Takashi  
 A. AOKI, ISHIDA & ASSOCIATES  
 Toranomom 37 Mori Bldg., 5-1,  
 Toranomom 3-chome  
 Minato-ku, Tokyo 105-8423  
 Japan



|  |  |
|--|--|
| <b>Date of mailing</b> (day/month/year)<br>25 February 2003 (25.02.03) | <b>IMPORTANT NOTIFICATION</b>  |
| <b>Applicant's or agent's file reference</b><br>H756-PCT               |  |
| <b>International application No.</b><br>PCT/JP01/01139                 | <b>International filing date</b> (day/month/year)<br>16 February 2001 (16.02.01) |
| <b>Applicant</b><br>FUJITSU LIMITED et al                              |  |

**1. Transmittal of the translation to the applicant.**

The International Bureau transmits herewith a copy of the English translation made by the International Bureau of the international preliminary examination report established by the International Preliminary Examining Authority.

**2. Transmittal of the copy of the translation to the elected Offices.**

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following elected Offices requiring such translation:

CA,CN,US

The following elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

GB,JP

**3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).**

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report.

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

|  |   |
|--|---|
| The International Bureau of WIPO<br>34, chemin des Colombettes<br>1211 Geneva 20, Switzerland<br><br>Facsimile No. (41-22) 338.90.90 | Authorized officer<br><br>Eliott PERETTI (Fax 338 9090)<br><br>Telephone No. (41-22) 338 9906 |
|--|---|

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

|  |  |                                |
|--|--|--------------------------------|
| Applicant's or agent's file reference<br>H756-PCT  | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |                                |
| International application No.<br>PCT/JP01/01139  | International filing date (day/month/year)<br>16 February 2001 (16.02.01)  | Priority date (day/month/year) |
| International Patent Classification (IPC) or national classification and IPC<br>H04L 7/033 |  |                                |
| Applicant<br>FUJITSU LIMITED   |  |                                |

|   |
|---|
| 1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.   |
| 2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.  |
| <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).<br>These annexes consist of a total of _____ sheets.   |
| 3. This report contains indications relating to the following items: <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul> |

|  |   |
|--|---|
| Date of submission of the demand<br>21 September 2001 (21.09.01) | Date of completion of this report<br>13 March 2002 (13.03.2002) |
| Name and mailing address of the IPEA/JP                          | Authorized officer  |
| Facsimile No.  | Telephone No.   |

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP01/01139

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed
- ☐ the description:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the claims:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, as amended (together with any statement under Article 19  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the drawings:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
pages \_\_\_\_\_, as originally filed  
pages \_\_\_\_\_, filed with the demand  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP01/01139

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

|                               |        |     |     |
|-------------------------------|--------|-----|-----|
| Novelty (N)                   | Claims | 1-8 | YES |
|                               | Claims |     | NO  |
| Inventive step (IS)           | Claims | 5-8 | YES |
|                               | Claims | 1-4 | NO  |
| Industrial applicability (IA) | Claims | 1-8 | YES |
|                               | Claims |     | NO  |

**2. Citations and explanations**

Document 1: US, 5953386, A (LSI Logic Corporation), 14 September 1999

Document 2: JP, 5-110428, A (NEC Corporation), 30 April 1993

Document 3: JP, 7-273648, A (NEC Corporation), 20 October 1995

Document 4: JP, 2000-323984, A (NEC Corporation), 24 November 1995

Document 5: JP, 9-135238, A (Fujitsu Ltd.), 20 May 1997

Document 6: JP, 11-298459, A (Hitachi, Ltd.), 29 October 1999

Document 7: JP, 2000-183731, A (Fujitsu Ltd.), 30 June 2000

**Claims 1, 2, 4**

The inventions described in claims 1, 2 and 4 do not appear to involve an inventive step based on documents 1 and 2 cited in the ISR. (1) A timing extract circuit, as set forth in document 1, that uses a clock having a frequency that is half the bit rate of the data signal to perform phase comparison at half intervals of the bit rate, and uses a PLL including 2 phase comparator circuits where the relative phase differs only by one cycle of the data signal, and (2) reverse controlling the phase of a clock signal by detecting that the phase comparison information output from a phase comparator circuit in a timing extraction circuit using the PLL of document 2 is invalid, both belong to closely related technical fields, i.e., timing extraction circuits using PLL; thus it would be easy for a party skilled in the art to conceive of applying the above described matters set forth in document 2 to the timing extraction circuit using PLL described in document 1.

**Claim 3**

The invention described in claim 3 does not appear to involve an inventive step based on documents 1 and 3 cited in the ISR. (1) The timing extraction circuit using PLL described in document 1 and (2) controlling clock signal phase by controlling VCO in cases where it has been detected that the phase comparison information output from a phase comparator circuit in a timing extraction circuit using the PLL of document 3 is invalid both belong to closely related technical fields, i.e., timing extraction circuits using PLL; thus it would be easy for a party skilled in the art to conceive of applying the above described matters set forth in document 3 to the timing extraction circuit using PLL described in document 1.

**Claims 5 to 8**

The inventions described in claims 5 to 8 appear to involve an inventive step over documents 1 to 7 cited in the ISR. Documents 1 to 7 do not describe the point about determining the duty between the input data around the time a PLL circuit is synchronized, and controlling data discrimination phase around the time that a PLL circuit is synchronized based on such determination results; nor would this point be easy even for a party skilled in the art to conceive of.